Interactions between energy efficiency policies and emission trading schemes

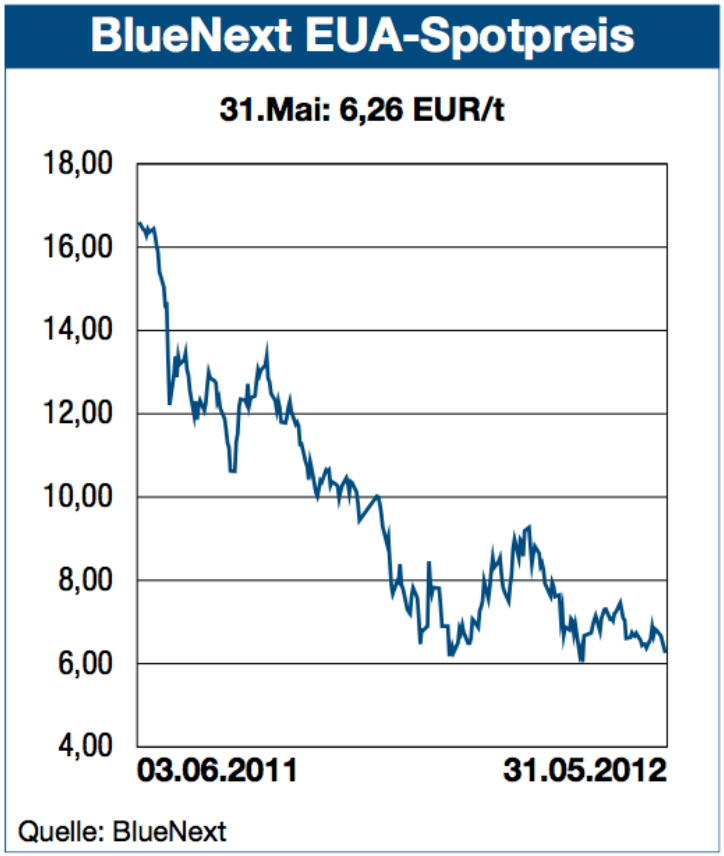
Modelling the effects on carbon prices and industrial competitiveness

Johannes Thema, Wuppertal Institute
Felix Suerkemper, Wuppertal Institute
Adrian Amelung, Institute for Economic Policy Cologne
Katharina Grave, Institute of Energy Economics Cologne (now at Ecofys, Berlin)

Presentation at
IEPEC 2012
13 June 2012

Johannes Thema
Research Group 2
Energy, Transport, Climate Policy
Wuppertal Institute

Motivation



Oversupply of EUAs:

Current period II (2008-2012):

1,300–1,600 Mt oversupply

Experts' estimation, DowJones TradeNews Energy, 1 June 2012

Period III (2013–2020):

„Including CERs, the oversupply might be 750–1,300 Mt CO_2eq"

World Bank Data, DowJones TradeNews Energy, 1 June 2012

„The downward pressure on carbon prices from the economic crisis, potentially to be exacerbated by the long awaited scaling-up of EU energy efficiency, threatens the ETS's ability to deliver Europe's low carbon future at the lowest cost."

Business calls for ETS Re-Calibration Now, European Energy Review, 15 Dec 2011

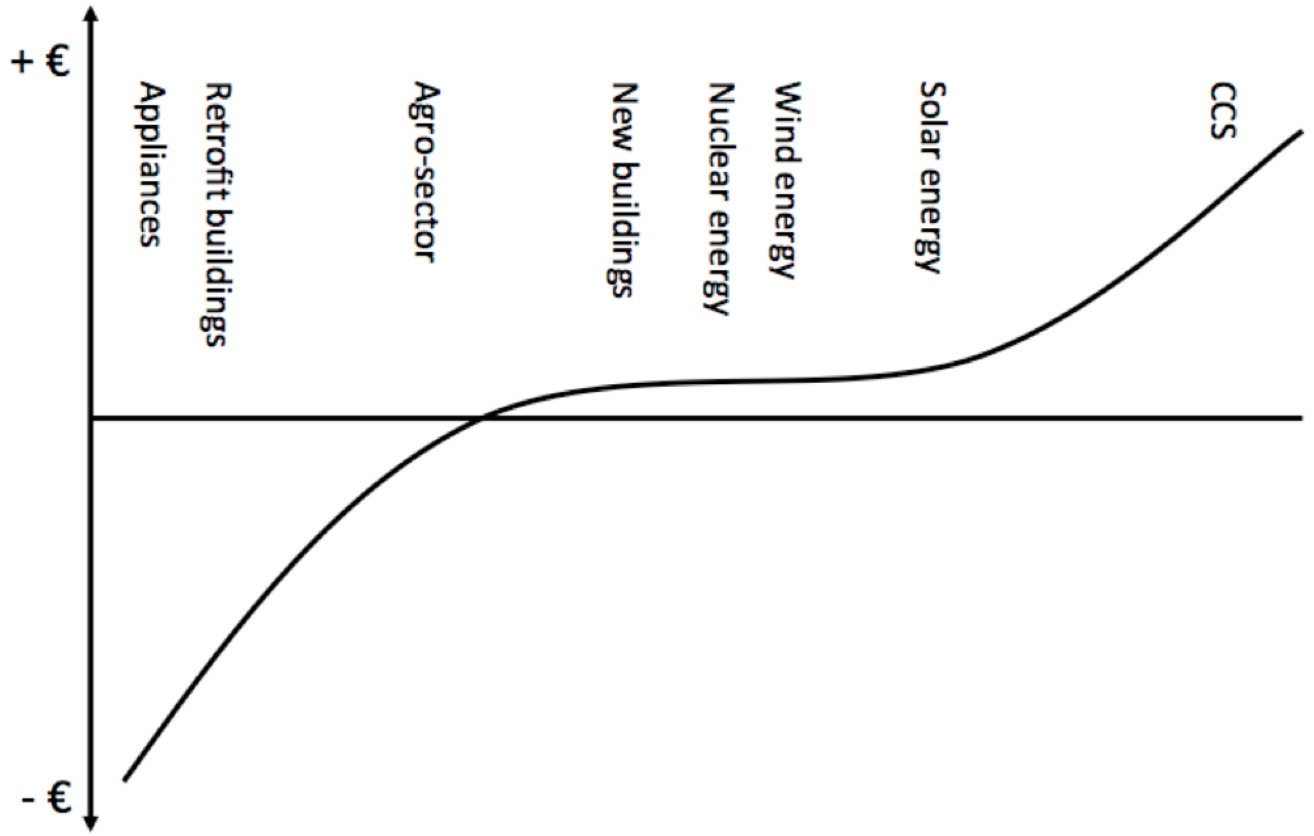
Research questions

1. What is the impact of EE policy on electricity and carbon prices?

2. What is the effect of different climate policy options on EU‘s industrial competitiveness?

3. How ambitious may a climate policy target be without causing excessive burdens to industry?

Cost-effective emission reduction potential

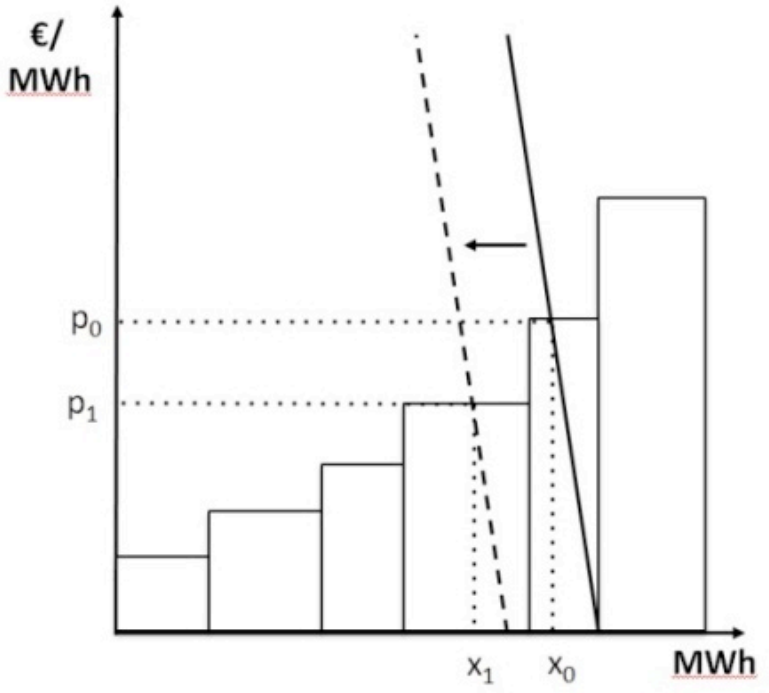


Source: Based on McKinsey (2009), Wuppertal Institute (2010), IEA (2010).

Theoretical argument

Two major impacts of EE policy and ETS:

A

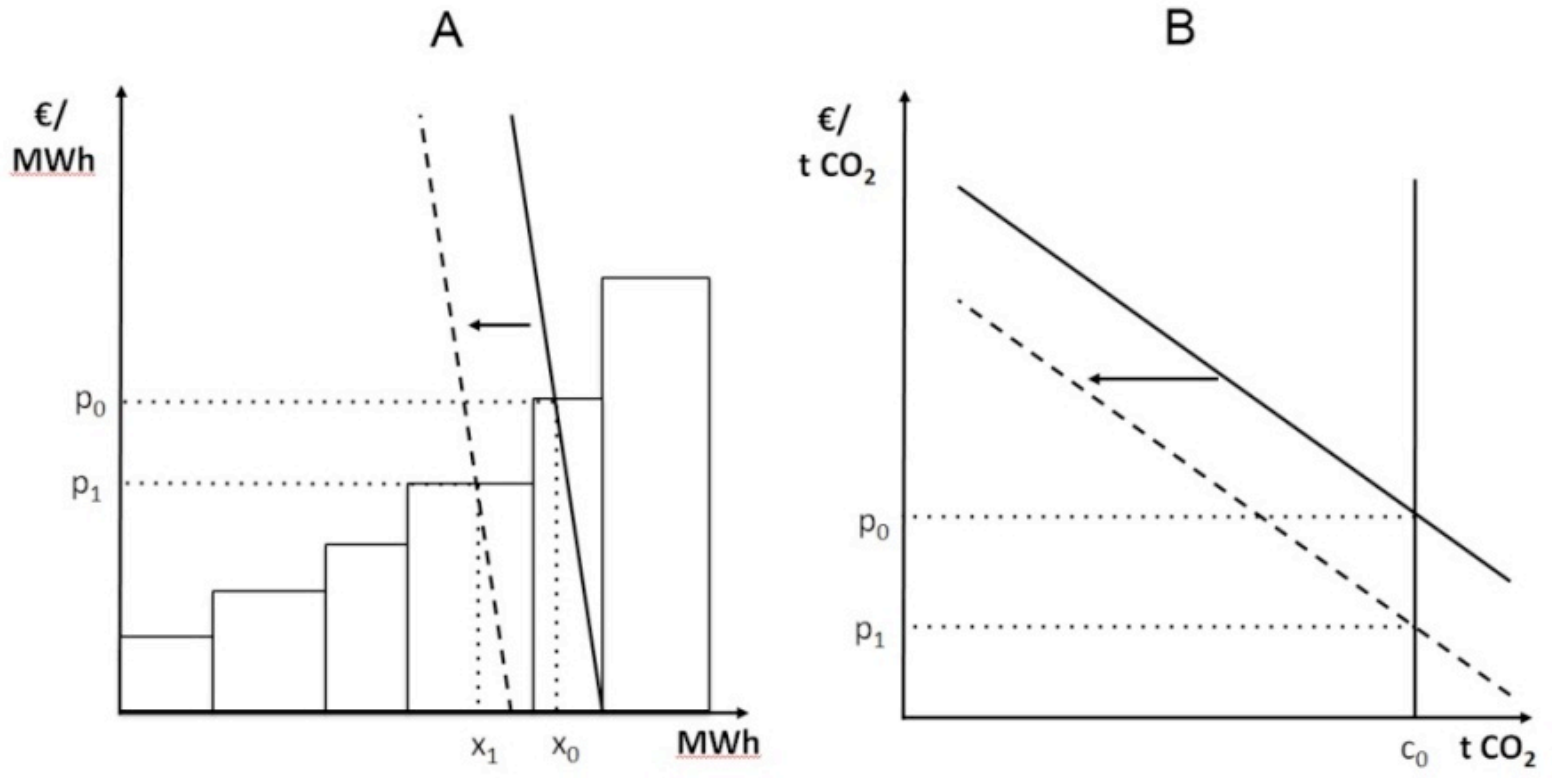


B

„Demand reduction effect“:
decreasing electricity wholesale prices

Theoretical argument

Two major impacts of EE policy and ETS:



„Demand reduction effect“: decreasing electricity wholesale prices

Demand effect: decreasing carbon prices

Operationalisation

EE policy: modelled as electricity demand reduction

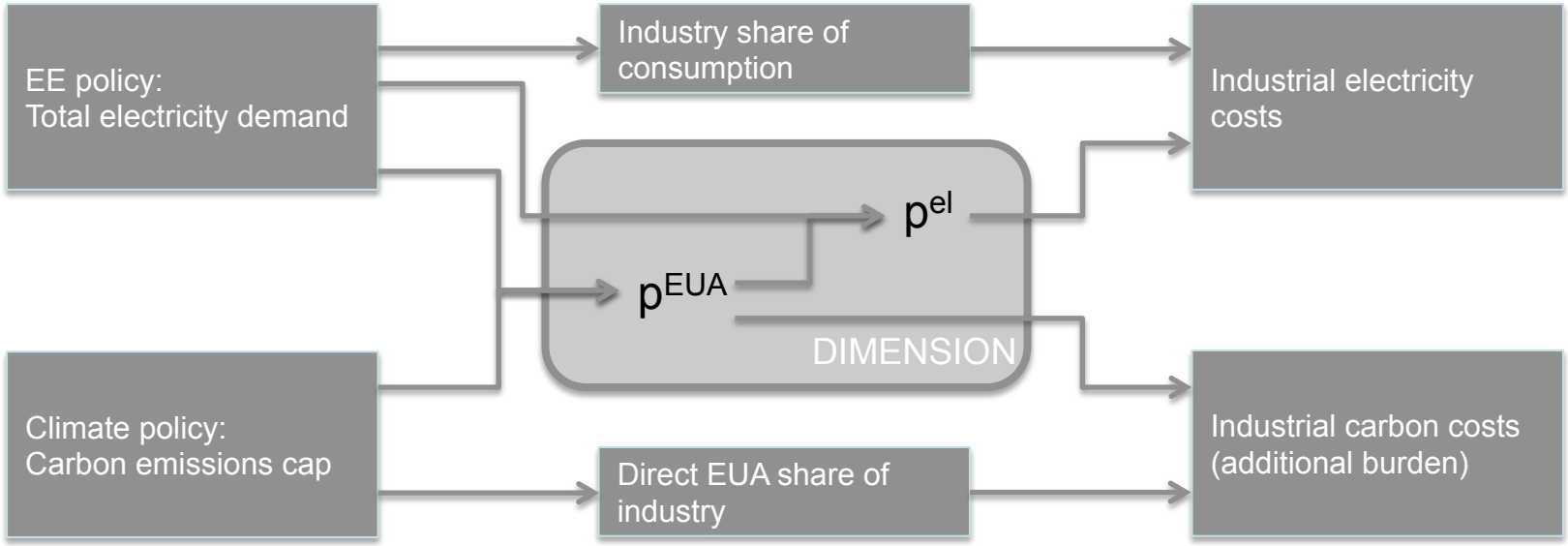
Competitiveness: modelled as overall cost to industry

$$C = c^{el} + c^{EUA} = p^{el} q_{ind}^{el} + p^{EUA} q_{ind}^{EUA}$$

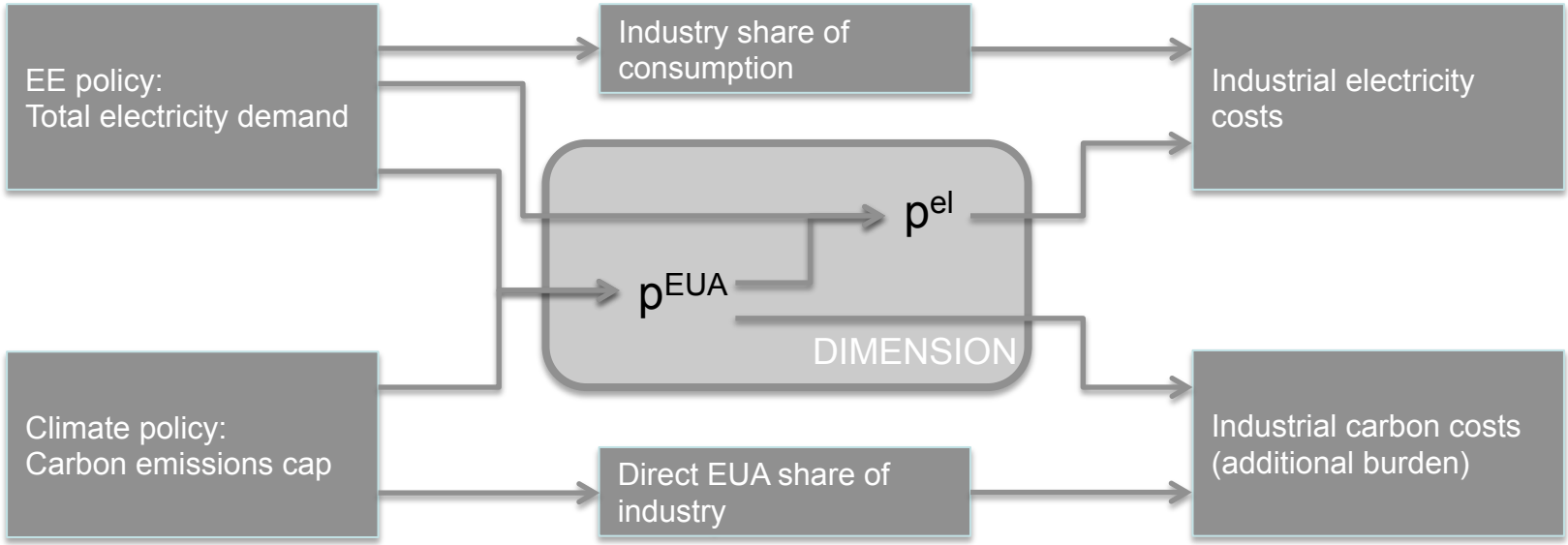
Definition „industry“: All industry other than electricity generation

Reason: Electricity generation sector not exposed to international competition

Model & scenarios



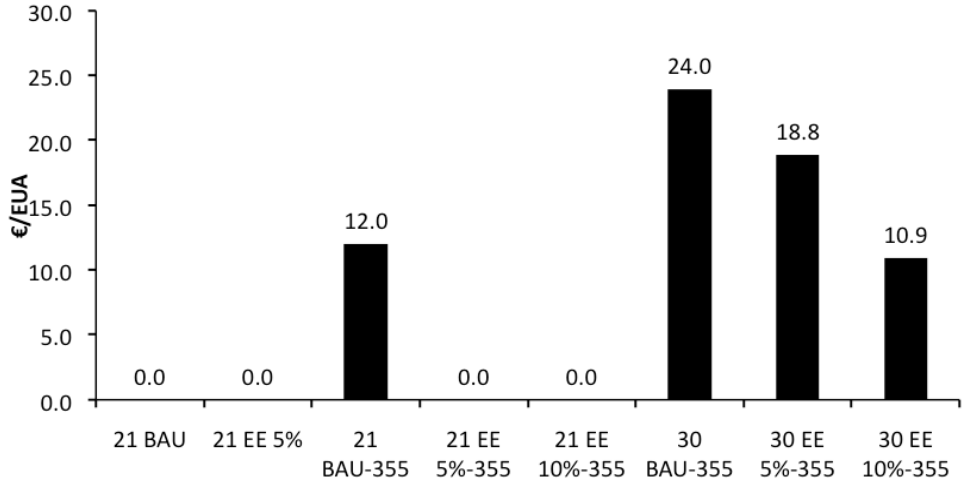
Model & scenarios



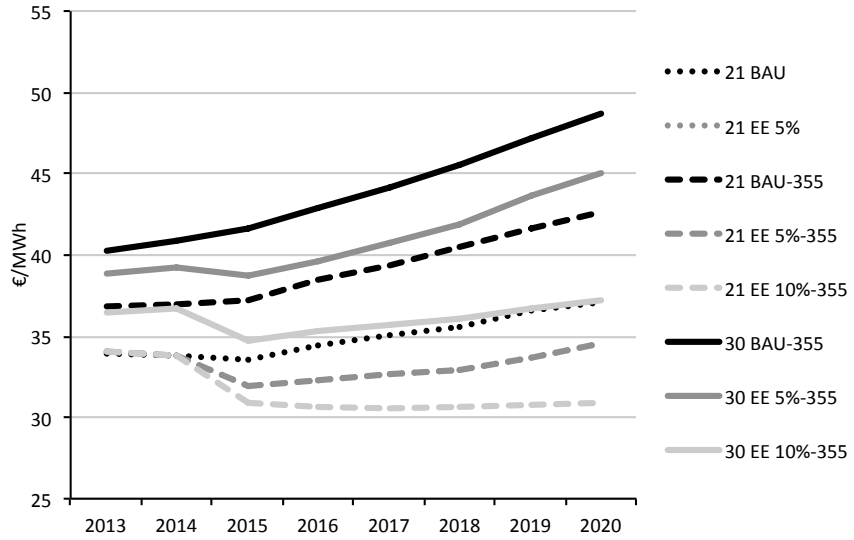
Scenario	Set aside compared to current legislation (Mt)	Equivalent to a cap reduction relative to 2005 (%)	Electricity demand decrease rel. to BAU (%)
noETS	-	-	-
21 BAU	-	21	-
21 EE5%	-	21	5
21 BAU-355	355	21 (+355 Mt)	-
21 EE5%-355	355	21 (+355 Mt)	5
21 EE10%-355	355	21 (+355 Mt)	10
30 BAU-355	355+1045	30	-
30 EE5%-355	355+1045	30	5
30 EE10%-355	355+1045	30	10

Results: Carbon prices & marg. generation costs

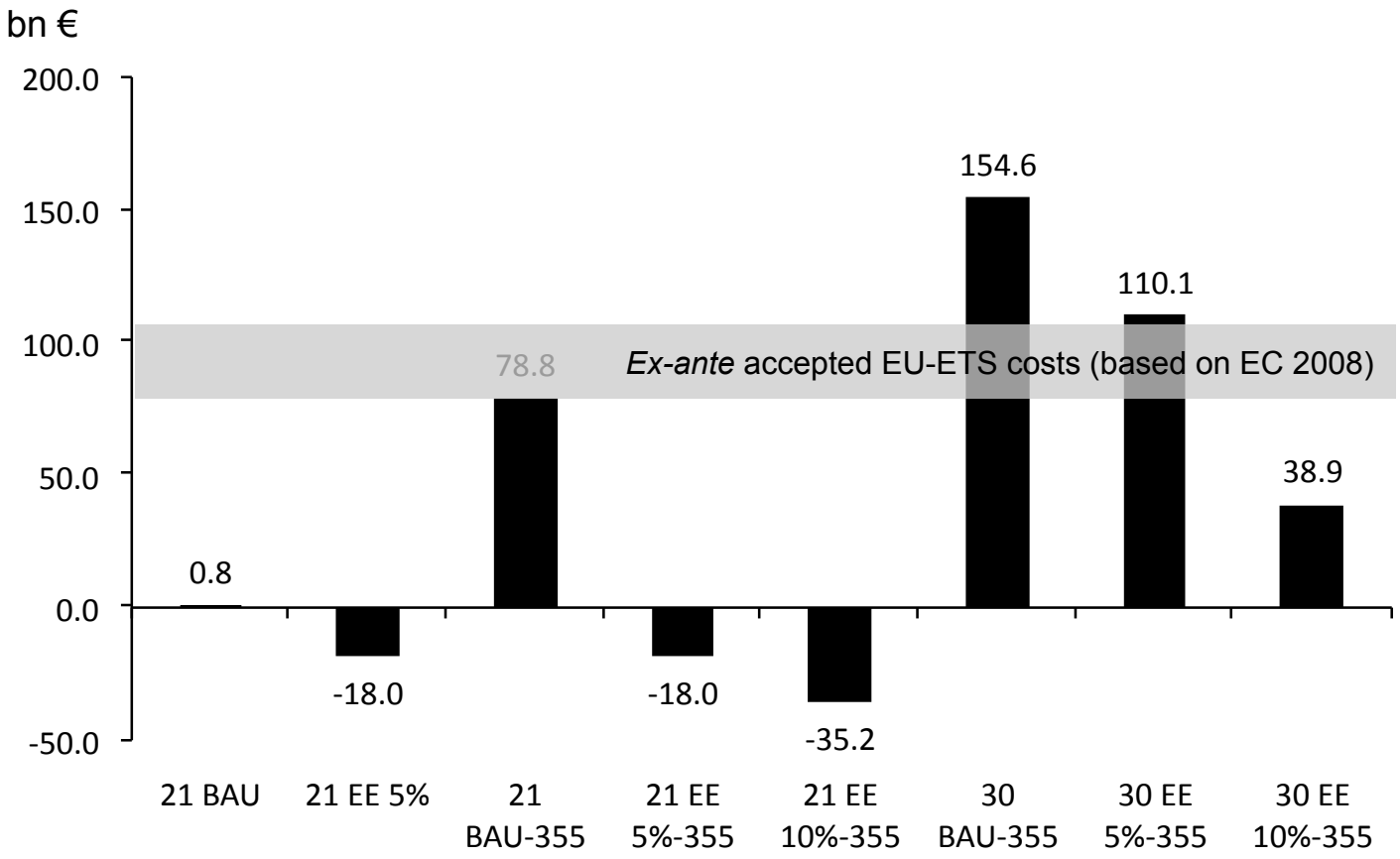
Carbon prices



Marg. generation costs (weighted means)



Expected EU-ETS system costs to industry



Conclusions

- Due to the least-cost GHG abatement potentials, (EE-) policies are necessary, but they interact with the ETS.
- ETS needs to be adapted (if system shall persist as effective mechanism)
- Cancellation of respective amounts of carbon certificates

But: costs to industry should be considered (carbon leakage)

- More ambitious climate targets are possible without additional burden for industry (compared to *ex-ante* accepted costs), if accompanied by effective EE policies.

Wuppertal Institute
for Climate, Environment
and Energy

ewi

iwp
Institut für Wirtschaftspolitik
an der Universität zu Köln

Thank you for your attention !

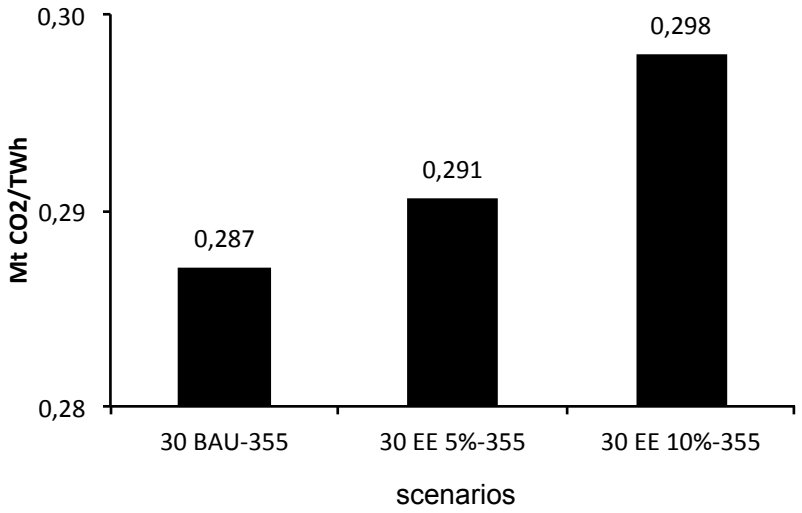
Your suggestions & comments for improvement are very welcome.
Please contact me personally or via **johannes.thema@wupperinst.org**

For further information
please visit our website:

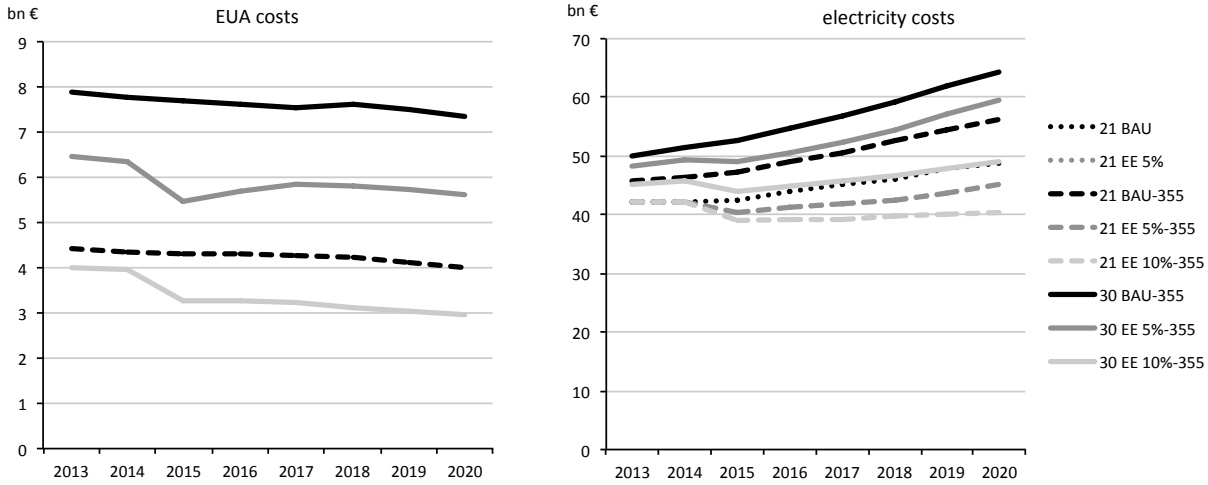
www.wupperinst.org

Results II: Carbon intensity

Carbon intensity of electricity generation for 30% cap reduction scenarios



Results III: Costs to EU‘s industry



Total electricity and EUA cost impact on EU industry (relative to no EU-ETS)